present level, has been preserved, together with the older rocks immediately adjoining.

The immediate contact of the Quebec limestones and underlying sandstones and quartzites was seen but not closely examined. There can, however, be but little doubt that the quartzites of Bonne Bay, on the east shore of the east arm, lie as described by Richardson and mapped by Murray, directly underneath the Quebec limestones, and are conformable. Whether they are the equivalents of the Potsdam or not, can only be determined from Richardson's observations and collections.

Collections were made at Anse au Loup and Amour Cove in the so-called Potsdam sandstones and limestones of the Canadian survey. The observations made at these points indicate a fauna quite distinct from those of any of the limestones or slates of the west coast of Newfoundland. The absence of Cephalopoda and the prevalence of primitive forms of Archeocyathus show the rocks to be probably older than those of the Quebec group at Port au Choix and other localities. The primitive sponges, or Archeocyathi, have here replaced corals completely, and may be described as reef-builders, since numerous hummocks and masses and parts of the strata are formed entirely of their remains. Immediately below these limestones, and conformably with them, lie the red sandstones, several layers of which are perforated with Scolithus burrows.

The geological evidence brought forward by Sir William Logan in the report of Canadian geological survey, 1863, to prove that the straits of Belle Isle have been partly formed by a synclinal valley, appears to us to be very defective. It is more in accord with the evidence to consider that the whole of northern Newfoundland was once much more elevated, and has been sunk by faulting until at the straits the Quebec has been brought down to the same level as the red sandstones of the opposite Labrador shore. The origin of the straits would in that case be considered as due to the changes of level produced by one or more of the same great series of parallel faults already traced by Richardson, Murray and Howley along the west coast. These run parallel with the axis of the straits, and seem to account fully for all the phenomena.

Observations were made upon the raised beaches and terraces which occur along the shores of Newfoundland and Labrador; and here, as well as at Anticosti and the Mingan islands, the marks of the recent elevation of the land are abundant.

ALPHEUS HYATT.

An archeologist in trouble.

I am writing a book on American archeology, and as I cannot reconcile the accounts that are given of some of the most noted earthworks of the Mississippi valley, I naturally turn to you for help. Thus, for instance, I find that, according to one authority, Cahokia mound covers an area of fifteen acres; another puts it at twelve; whilst a third is content with six. All these gentlemen were practical explorers, and as they took the measurements 'carefully,' some of them even with mathematical instruments, there can, of course, be no mistake in the figures. In regard to the Serpent mound in Adams county, Ohio, there is a similar state of affairs. One practical explorer, who is nothing if not thorough, tells us that it is 1,415 feet long; another says it is 1,116; whilst a third, too wise to commit himself to any precise figures, merely says that, if extended, it would not be less than one thousand. To any but a practical explorer, these discrepancies may seem large, and, no doubt, they will deter a mere historical student from using these figures in any statement that aims at accuracy; but in reality they are not of much importance, since it is possible, by a judicious use of the system of averages, to arrive at conclusions that are certainly as near the truth as are most of the original measurements. One thing, however, does bother me, and that is the 'frog' which a recent explorer has discovered in front of the so-called 'egg' that lies between the serpent's jaws. It is 61 feet long, exclusive of the hind-legs, and is said to be in high relief (three feet); though another practical explorer, who visited the same work at about the same time, saw nothing of a frog, either jumping or sitting still, but does speak of a cow-path which may enclose an area of about that size. Now, Mr. Editor, what am I to do? I cannot go out there myself and 'step off' these distances; and if I did, some long-legged fellow would be sure to come along with *his* pair of mathematical instruments, and prove that my measurements were all wrong. Besides, I don't intend to give up that frog—it adds too much to the picture I am having prepared—and yet, I do not see how I am to average it so as to keep my measurements accurate.

R. R.

The spectrum of γ Cassiopeiæ.

Using a high dispersion, and the same precaution with regard to the eye as described upon a former occasion, in addition to the hydrogen lines, there are seen in the spectrumof γ Cassiopeiæ two lines and a dark space between C and D_3, five bright lines and three dark ones between D_3 and $H\beta$, one bright line between $H\beta$ and $H\gamma$, and perhaps another between $H\gamma$ and $H\delta$, with a dark space near $H\delta$. Changing the scale readings of these lines into wave-lengths, we obtain practically, with one exception, the same values as those of the bright lines observed in a solar protuberance in a total eclipse.

These lines apparently do not necessarily all appear at once, and afford an excellent field for study.

O. T. S.

New Haven, Oct. 21.

The care of pamphlets.

Mr. Goode asks, in *Science* of October 16, for the experience of others in regard to the care of pamphlets in scientific libraries. I give below a quotation from the publications of the Washburn observatory, vol. ii., which describes my plan, which was originally described in the *Library journal* for June, 1880.

"The pamphlets are kept in large drawers immediately below the book-shelves, and a drawer is devoted to a subject. As soon as a pamphlet is received, it is catalogued under its author's name, and placed in the drawer devoted to its subject. All the pamphlets on a given subject can therefore be at once consulted in one place; and all the works of a given author are to be found together in the card catalogue. I have used this plan for keeping pamphlets for [thirteen] years, in my own library, in the library of the U. S. naval observatory, and here, and I consider it to be an entirely satisfactory solution of the

troublesome problem of how to treat pamphlets in professional libraries." EDWARD S. HOLDEN.

Washburn observatory, Oct. 19.

An attempt to photograph the corona.

By a slip of the pen in my communication on this subject in the last number of *Science*, I gave the references to two previous letters as April 29 and April 13. These should read May 29 and May 15. By a typographical error I am made to refer the observations on the light of the corona to Prof. S. P. Langley. The observations were made by his brother, Prof. John W. Langley.

According to his observations, as we have already seen (*Science*, August 14), the light of the corona within 1′ of the sun's disk is six times that of the full moon; which, according to my observations, would be one-fiftieth that of our atmosphere in this vicinity. Professor Bonney states, (The sun, p. 229.) that a brilliancy of only one sixty-fourth would be sufficient to render the planets visible. Therefore, even if the atmospheres of Mercury and Venus produced no visible effect at all, the facts would still sustain Professor Langley's observations.

WM. H. PICKERING.

Recent Proceedings of Societies.

Philosophical society, Washington.

Oct. 24.—Mr. H. A. Hazen read a paper on condensing hygrometers and sling psychrometers. As preliminary to the paper proper, Mr. Hazen gave the results of some interesting experiments which he had made with a view of determining the most desirable distance between the lines upon the stem of a thermometer, in order that tenths of degrees may be estimated with the greatest accuracy. He had made a considerable number of trials, in which he had first estimated the fractions, and afterwards measured them by the use of a vernier. The results seemed to indicate that there was a length of division on which the estimation of tenths might be made with greater precision than on one either longer or shorter. Mr. Hazen did not consider, however, that his experiments were sufficiently numerous to enable him to determine this with certainty. On directly addressing himself to the subject of his paper, he called attention to the various forms of Regnault's condensing hygrometer, which had appeared from time to time, briefly discussing the advantages and disadvantages of each. He spoke of the numerous methods which have been devised for ventilating the psychrometer, and expressed his belief that the form known as the 'sling' was the best of all. Experiments made by using both of these instruments for the purpose of determining the value of the constant A in the common psychrometric formula were described, and the effect of elevation was considered. ——Mr. Mendenhall exhibited one of Sir Wm. Thomson's long-range voltmeters, which had been recently imported by the chief signal officer. A small cylinder of soft iron hangs upon the short arm of an index lever, which is so balanced as to be practically in indifferent equilibrium. The iron is surrounded, without contact, by a coil which is so wound that the strength of the field produced by the passage of a current increases from the lower to the upper end of the coil. As the pull on the soft iron is proportional to rate of the change of the square of the strength of field, and as this rate diminishes from the lower to the upper end of the coil, the force exerted on the cylinder will depend at once on the current strength and on its position in the coil. By hanging a small non-magnetizable weight to the iron by means of a hook projecting from the lower end, this force is made to be constant when equilibrium exists, so that when the current strength varies, the position of the iron cylinder changes, and this position is read off on a scale at the extremity of the long arm of the lever. The great merits of the instrument are its constancy and the ease with which it may be adapted to the measurement of potentials differing greatly in magnitude.—Mr. Mendenhall also made some remarks upon instruments and measurements of the so-called re-action time, originating in the exhibition of these instruments by Dr. Matthews at a previous meeting of the society. He referred to a paper upon the subject, which he had published in the *American journal of science*, in 1871, in which instruments and methods are described identical in many respects with those recently exhibited. Results were given, showing the time occupied in responding to a signal, which was a flash of light, the appearance of a card, a sound, or a blow upon the hand or head, and also the time consumed in the simplest processes of reasoning. These times were, in general, shorter than those recently obtained by Dr. Matthews, but differences in the manner of conducting the experiment will doubtless account for this.——Mr. Harkness discussed the flexure of transit instruments. He pointed out its dependence on the form of the instrument, and also that its amount might be expressed as the sum of two different functions of the zenith distance. The nature of one of these functions can be readily ascertained; but unfortunately that of the other is unknown, and, in a general sense, impossible to determine. For certain classes of instruments it might be ascertained by the assumption of accuracy in tables of star positions, but Mr. Harkness declared that he knew of no way by means of which the problem could be completely solved for the astronomical observatory. Discussion of this paper was prevented by the operation of a rule of the society, in obedience to which it closes its session promptly at ten o'clock. In a general way, it cannot be denied that a strict compliance with this rule has many advantages. A visitor to the society may be certain that he will not be obliged to wait for more than a minute or two after eight for its beginning, and, however uninteresting to him the dissertations to which he listens may be, he may console himself by the reflection that a limit is set to their duration.

Academy of natural sciences, Philadelphia.

Oct. 20.—A communication was read from Mr. W. N. Lockington on the causes of elevation and depression of the earth's surface, with special regard to the setting of loosely compacted sediments by pressure of superincumbent beds. Some have supposed that the great beds of ice which encumber the poles bear down the surface rocks of the region by their weight. It is, of course, possible that a downward movement of the earth's crust may be caused by strata piled upon it; but as the earth's contraction is a sufficient cause for all such movements, it is useless to postulate other causes. The extreme of possible compactness, however, is reached in the sediments themselves by the